IMPROVING THE COMPREHENSION OF REFERENCE PERIODS

Michael L. Hubbard, Judith T. Lessler, Kenneth A. Graetz and Barbara H. Forsyth, Research Triangle Institute
Michael L. Hubbard, PO Box 12194, Research Triangle Park, NC 27709-2194

KEY WORDS: anchoring, cognitive methods

1. Introduction

This paper describes a pair studies directed at examining alternative questioning strategies for the National Household Survey on Drug Abuse (NHSDA). The NHSDA provides comprehensive national data on drug use. Currently, data are collected using a combination of interviewer and self-administered questions. General questions on health and demographics are interviewer administered, while questions on more sensitive topics, such as the use of illegal drugs, employ self-administered answer sheets.

Respondents frequently demonstrate a variety of errors when answering these types of questions. For example, in the 1988 survey, about 20 percent of the sample indicated they had used a drug at least once in the previous 12 months yet, in a subsequent question, indicated they had not used the drug in the previous 12 months.

Under contract with the National Institute on Drug Abuse (NIDA), RTI designed a number of methodological studies exploring possible cognitive explanations and remedies for errors of this sort.

2. Cognitive Appraisal

First, a cognitive appraisal of the 1988 version of the NHSDA questionnaire (Forsyth, Lessler, and Hubbard, 1990) was conducted. Drawing on Oksenberg and Cannell's (1977) model of the question answering process illustrated in Exhibit 1, a coding scheme was developed for examining each question. In addition, some intensive interviews were conducted using a combination of "think-aloud" methods and informal probe and follow-up questions. This appraisal identified several problems: (1) the frequent use of vague or ambiguous terms, (2) the use of time periods that were unanchored and difficult to define, and (3) items that asked implicit, hidden questions. The current research focuses on the the anchoring of reference periods.

The recall of autobiographical information from unanchored reference periods appears to be a task of sufficient cognitive complexity as to result in the widespread use of faulty heuristics and strategies and the frequent misinterpretation of the questions themselves. A large number of the questions in the NHSDA include reference periods that are defined as "the past 30 days" or "the past 12 months." No specific dates are given, thus, these periods are subject to multiple interpretations. Anecdotal evidence was obtained in an analysis of the intensive interviews. Some respondents reported thinking of the past 12 months as synonymous with the calendar year. Others either viewed it as the prior 12 months or seemed to be using an "average year" interpretation. The analysis of the interviews also revealed that respondents often used poor estimation strategies when answering the questions. This undoubtedly led to inaccurate estimates. Based upon these observations, two laboratory experiments were designed aimed at improving the comprehension of reference periods.

3. Laboratory Study 1

The goal of the first experiment was to examine the effects of providing reference period anchors on the reporting of event frequency and to determine if the number of events reported could be affected by encouraging the respondents to use different recall strategies.

Accurate recall of the number of events in a reference period requires that respondents be able to determine if the information that they are recalling falls in or out of the reference period. Various procedures are used in surveys for anchoring reference periods. Some surveys provide calendars for respondents and show them the dates. Other surveys use bounded reference periods. This procedure consists of asking the respondent about events since a prior interview, comparing the reports to those from the prior interview, and removing any events that have been "telescoped" into the reference period. In addition, researchers have suggested that "landmark" events or personally experienced events can be used to bound reference periods (Loftus and Marburger, 1983). Recent research has demonstrated the effectiveness of using personally experienced events as aids in recall during intensive interview situations. Means et. al. (1989, 1987) showed that recall accuracy regarding medical visits for chronic conditions could be dramatically improved by having respondents recall a personal event for each month in an 18 month reference period and record it on a calendar.

Since it did not appear practical to use an intensive interview method such as that implemented by Means, the current design tested whether more global strategies could be used.

The respondents were 143 people from the Research Triangle area. Because heavy drug use was uncommon in this sample, the respondents' reported frequency of four different types of activities was compared: (1) the use of alcohol, cigarettes, and marijuana (a subset of the NHSDA drugs of interest), (2) the use of over the counter medications,(3) non-drug taking activities that were social, and (4) non-drug taking activities that were consumptive.

Exhibit 2 contains a list of the behaviors included in the study. Respondents answered questions in group sessions using a self-administered questionnaire. Respondents answered questions under two anchoring conditions (ANCHORED, NOT-ANCHORED) and two strategy conditions (DIRECT ENUMERATION, GENERAL RULE). Respondents who were in the anchoring condition were provided dates for the reference periods and asked to think of a personally experienced event that happened around that date. In addition, they were provided a calendar to use during the session. Respondents in the not-anchored condition were merely told to think carefully about the time periods.

A manipulation of recall strategy was attempted by altering question wording and by instructions that were provided at the beginning of the session. Respondents who received the DIRECT ENUMERATION manipulation were told to try and remember each time that they engaged in the activity and to come up with a sum. Respondents in the GENERAL RULE condition were asked to think of their typical behavior patterns when calculating their frequency estimates.

No hypotheses were advanced as to what set of conditions would result in "better" estimates. The goal was to determine whether differences would emerge in reporting frequency of behavior across the conditions for the different recall periods. Respondents were asked to consider the following reference periods: (1) 2-weeks, (2) 30-days, and (3) 1-year. The respondents were also asked to describe the strategy they used in calculating their answers.

4. Results for Laboratory Study 1

There were no significant differences due to these treatments. Exhibit 3 shows the results for the two strategy conditions; Exhibit 4 shows the results for the two anchoring conditions. Why are there no differences? At least two reasons are plausible: (1) anchoring and direct recall strategies do not effect reporting of these types of behaviors and (2) the respondents were not using the anchors or the different recall strategies as they answered the questions. This could be due to the fact that the questionnaire was self-administered in a group setting with very little personal supervision.

There is some evidence supporting the latter explanation. Respondents were asked to list their anchoring events on the calendar provided. These anchors were then coded as to whether the events were personal or impersonal. For the 2-week reference period, only 66 percent of the respondents actually came up with a personal anchor; 61 percent provided a personal anchor for the 30-day reference period; and only 24 percent provided an anchor for the 1-year reference period. The strategies that respondents reported using for the different reference periods were also coded. It appears that the length of the reference period, rather than the experimental instructions, determined the strategy that the respondents used for recall. Exhibit 5 illustrates the percent of respondents using a direct recall strategy for each of the three time periods.

5. Laboratory Study 2.

The goal of the second laboratory experiment was to improve the manipulation of the reference period anchoring. Improvements were tested by comparing self-report answers using questions analogous to those collected in the NHSDA with "best" answers from in-depth questioning during personal interviews. In order to generate sufficient data on drug use, 72 drug users were recruited for this experiment. They were randomly assigned to receive either the ANCHORED or NOT-ANCHORED condition. Experienced field interviewers were trained to carryout the experiment.

Respondents in the ANCHORED condition were told that the time periods were very important and were provided a Time Point Reminder Form which included a calendar. Respondents were then asked to recall something form their lives that happened at four different time points: 30-days, 6-months, 12-months, and 3-years prior to the date of the interview. These time points were chosen because they were the category boundaries for the questions on recency of drug use. The interviewer circled the boundary date on the calendar and wrote down the incident that the respondent recalled. Respondents in the NOT ANCHORED condition received a discussion about the importance of providing complete information.

6. Results for Laboratory Study 2.

Exhibit 6 presents results on the percent of respondents who changed their initial answer during the intensive interview in the two conditions. Overall there were fewer changes among respondents in the ANCHORED condition than for those in the NOT ANCHORED condition, however, the proportion of respondents who had used the drugs was very small. None of the differences were significant for any of the questions on particular types of drugs.

No significant results were obtained for differences in the difference scores. Many respondents did not change their answers between the original interview and the intensive interview. It is possible that the respondents were tired at the end of the interview and did not put much effort into coming up with the "best" answers. In addition, there were some respondents who had very large differences between their initial interview and the intensive interview so that the variances of the differences scores were very large.

This set of interviews was tape recorded. Thus, the discussions could be coded as to the effectiveness of the anchoring condition. The anchoring events were rated according to their specificity in the following manner: (1) a "specific" event was one that took place at a specific place and time (i.e., "I went to the dentist and had my tooth pulled."), (2) a "somewhat specific" event was more general and not as focused in time (i.e., "I drove home for the weekend."), and (3) an event that was "not specified" included events that were not focused on a particular time point (i.e., "I felt good.").

The recalled events were also scored in terms of their precision relative to the anchoring point as follows: (1) occurring exactly at the anchor point, (2) occurring within a week of the anchor point, (3) occurring within 2 weeks of the anchor point, (4) occurring within one month of the anchor point, (5) occurring more than one month after the anchor point, and (6) occurring at an unspecified time.

Respondents who were able to come up with a either a specific or somewhat specific event and whose events were scored a 1 or 2 on the precision scale were classified as fairly well anchored. Overall, 43 percent of the memory statements were classified as anchors of this type. For the 30-day, 6-month, 1-year, and 3-year reference periods, the average percentages of such memory statements were 56 percent, 49 percent, 51 percent, and 22 percent.

7. Discussion.

The results of these experiments were somewhat disappointing. Many surveys ask respondents to recall the number of events in specific reference

periods. Since both bounded and intensive interviewing is expensive and time consuming, it was hoped that these studies would demonstrate the effectiveness of less intensive techniques. This was not the case, although, in Study 2, the results are in the predicted direction.

Perhaps respondents' estimates of the frequency of personal drug use are not generated by directly recalling individual incidences but by an estimation or averaging process that is not sensitive to the time periods used in these studies. If this is the case, it is possible that the ability to recall other types of events would be effected by using these types of less intensive procedures to anchor the reference periods. However, it may also be the case that either a more intensive interaction than was used in these studies is needed to anchor the reference periods or that respondents who were not in the ANCHORING condition were independently generating these kinds of anchors.

8. Field Test Studies.

Additional studies will be carried out in the context of a field test this fall. Different modes of interviewing, including two versions of a self-administered questionnaire with skip patterns, will be tested. In addition, two versions of an interviewer administered questionnaire will be used. The questionnaire with skip patterns and the interviewer administered questionnaires are directed at finding alternatives to requiring respondents who have not used a particular substance to answer every survey question. Alternative versions of the questionnaire also entail use of different wordings and decomposition of some questions that entail complex concepts.

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EXHIBIT 1

Model of the Response Process

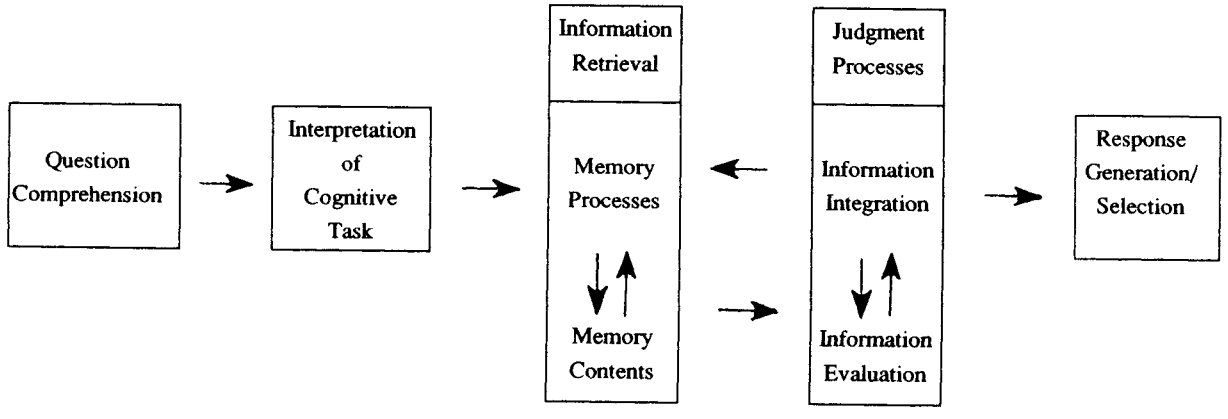

Exhibit 2: Behaviors for Laboratory Experiment 1

NHSDA Drug Use	Over-the-counter Drug Use
Smoke cigarettes	Take a vitamin
Have at least one drink containing alcohol	Take stomach medicine such as Tums or Pepto Bismol
Smoke marijuana	Take cough medicine
	Take headache medicine such as Asprin or Tylenol
Moderate Frequency Social	**Moderate Frequency Consumptive**
See a movie at a theater	Eat French fries
Go to a friend's house	Write a check
Go to a shopping mall	Eat chocolate
High Frequency Social	**High Frequency Consumptive**
Eat dinner with your family	Eat a between meal snack
Have a coffee break with someone	Watch TV news
Talk with friends on the phone	Drink a soft drink

Exhibit 3: Means for Strategy Conditions: Mean Number of Behaviors Report by Strategy by Reference Period

NHSDA Drug Use	Direct	General
2-weeks	4.47	5.86
30-days	9.83	13.00
1-year	116.63	164.46
Over-the-Counter Drugs		
2-weeks	7.44	7.56
30-days	16.41	15.81
1-year	167.06	147.45
High-Frequency Consumptive		
2-weeks	27.47	26.71
30-days	58.92	57.14
1-year	697.06	658.76
Moderate Frequency Consumptive		
2-weeks	11.83	12.31
30-days	25.17	27.31
1-year	307.14	289.74
High Frequency Social		
2-weeks	22.42	18.35
30-days	47.25	41.82
1-year	547.78	517.29
Moderate Frequency Social		
2-weeks	5.64	4.58
30-days	11.50	11.22
1-year	119.15	118.86

Exhibit 4: Mean Number of Behaviors Reported by Anchored-Not Anchored by Reference Period

NHSDA Drug Use	Anchored	Not-Anchored
2-weeks	5.19	5.5
30-days	11.19	11.64
1-year	138.89	142.17
Over-the-Counter Drugs		
2-weeks	7.00	7.99
30-days	15.42	16.81
1-year	143.81	170.31
High-Frequency Consumptive		
2-weeks	27.34	26.36
30-days	58.48	57.61
1-year	687.09	669.83
Moderate Frequency Consumptive		
2-weeks	12.63	11.53
30-days	28.09	24.40
1-year	318.14	289.74
High Frequency Social		
2-weeks	21.44	19.38
30-days	46.64	42.47
1-year	548.97	516.03
Moderate Frequency Social		
2-weeks	5.64	4.58
30-days	12.75	9.97
1-year	135.27	102.89

Exhibit 5: Percent of Respondents Using a Direct Recall Strategy by Time Period

	Strategy Instruction	
Time Period	Direct Enumeration	General Rule
2-weeks	56%	54%
30-days	29%	28%
1-year	15%	18%

Exhibit 6: Changes for Respondents Giving Non-Zero Answers

Recency of Use	Not Anchored	Anchored
Alcohol	2.8	0.0
Marijuana	0.0	0.0
Cocaine	3.1	0.0
Inhalants	20.8	5.3
Hallucinogens	0.0	7.4
Heroin	0.0	6.3
Sedatives	16.0	5.6
Tranquilizers	0.0	4.8
Stimulants	14.8	4.2
Analgesics	4.0	0.0
Crack	0.0	18.2
TOTAL RECENCY	5.5	3.7
30-Day Frequency		
Alcohol	22.2	15.4
Marijuana	10.0	16.0
Cocaine	20.0	0.0
Inhalants	0.0	0.0
Hallucinogens	50.0	0.0
Heroin	0.0	0.0
Sedatives	75.0	0.0
Tranquilizers	25.0	33.3
Stimulants	66.6	0.0
Analgesics	33.3	0.0
TOTAL 3-DAY	23.7	13.23